Launch Vehicle

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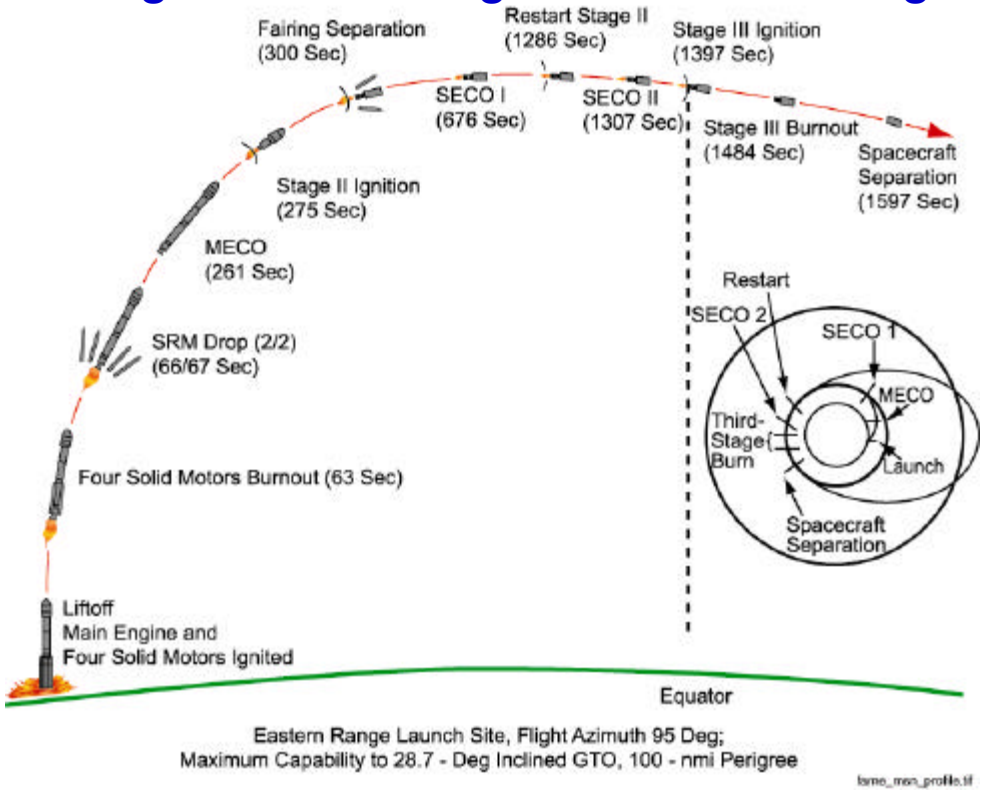
Current Baseline/Approach

- **Boeing Delta II 2425-10**
  - **3m/10’ Dia. Composite Fairing**
  - **29.1’ in Length**
  - **1st Stage - Rocketdyne RS-27A Main Engine Along With 4 GEM Solid Rocket Strap-ons**
  - **2nd Stage - Aerojet AJ10-118K**
  - **3rd Stage - Star 48 SRM**

Mission Profile and Performance Capability

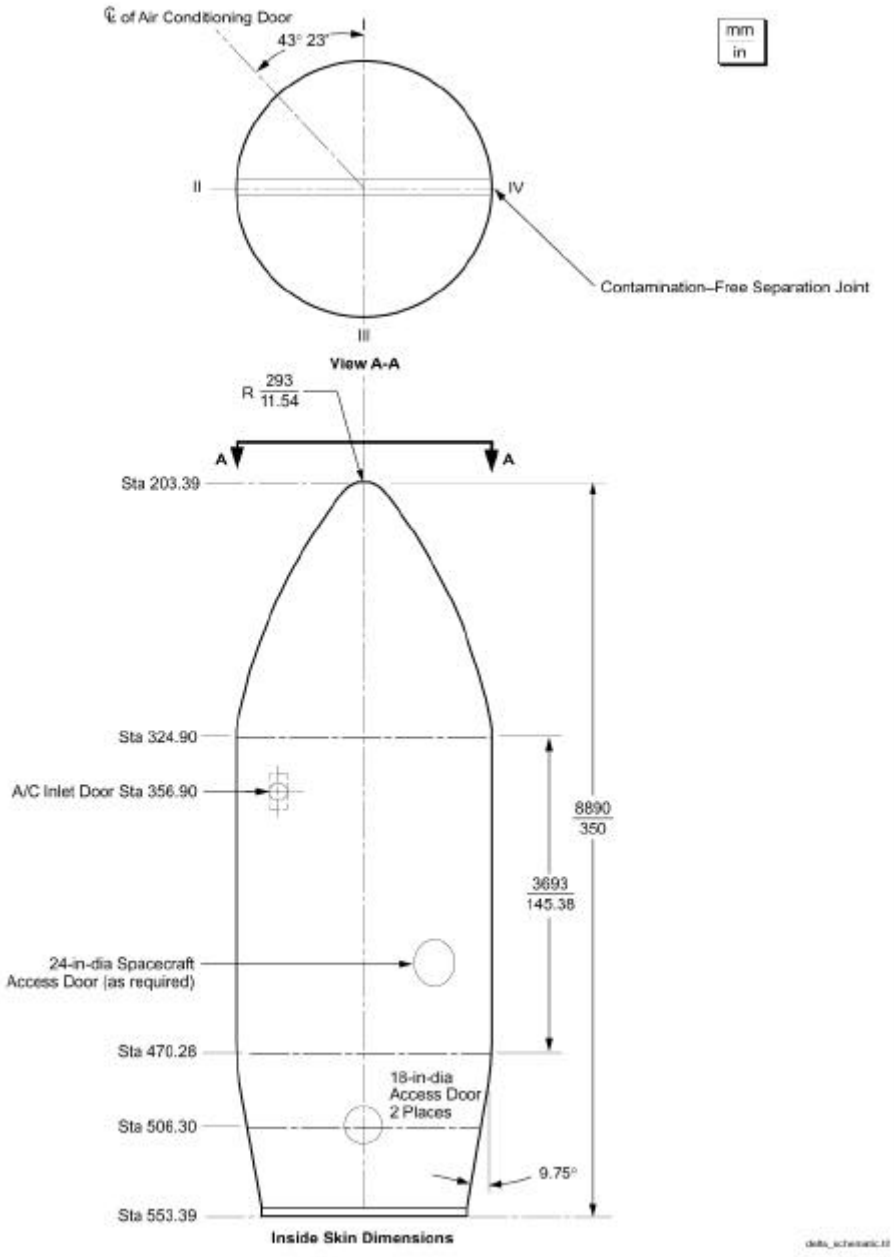
- Inclination = 28.7 Degrees
- Mass = 1100 kg/2426 lb
  - Current FAME Mass = 1089 kg
  - LV Margin = 11 kg
- Orbit = GTO 185 x 36086 km
- 3-Sigma Orbit Dispersions
  - Perigee Velocity = ± 9 mps
  - Inclination = ± 0.48 Degrees
- Boeing Is Off-Loading Star 48 Third Stage by 241 kg



Eastern Range Launch Site, Flight Azimuth 95 Deg;
Maximum Capability to 28.7 - Deg Inclined GTO, 100 - nmi Perigee

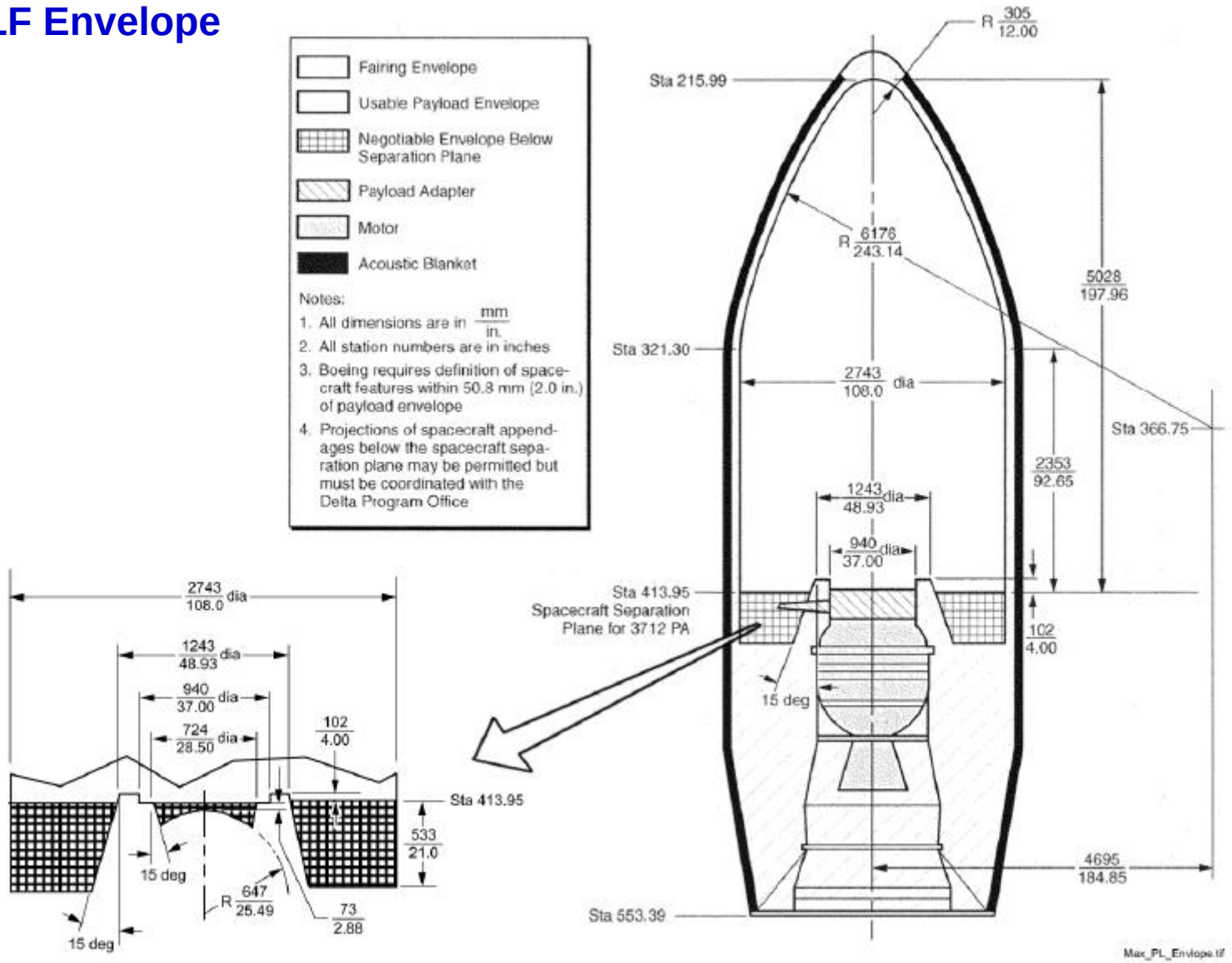
Payload Accommodations and Major Interfaces (1 of 6)

- **3m/10’ Dia. Composite PLF**
  - **3” Acoustic Blankets From Boattail to Sta. 213.42 in Nose Section**
  - **3 Standard 24” Dia. Doors for S/C Access Part of Baseline Service**
  - **1 Standard A/C Inlet Door**



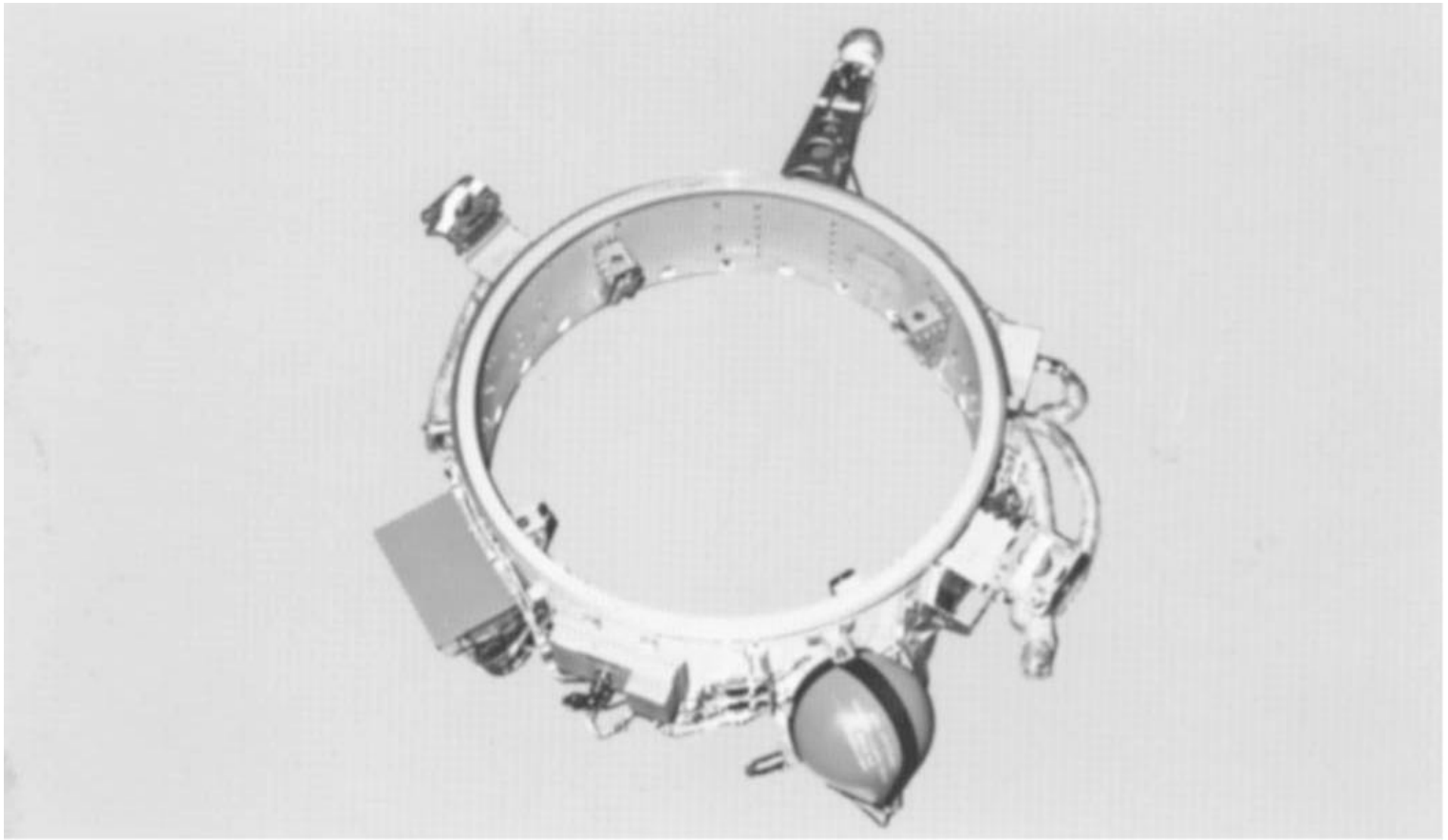
Payload Accommodations and Major Interfaces (2 of 6)

- **10’ PLF Envelope**



Payload Accommodations and Major Interfaces (3 of 6)

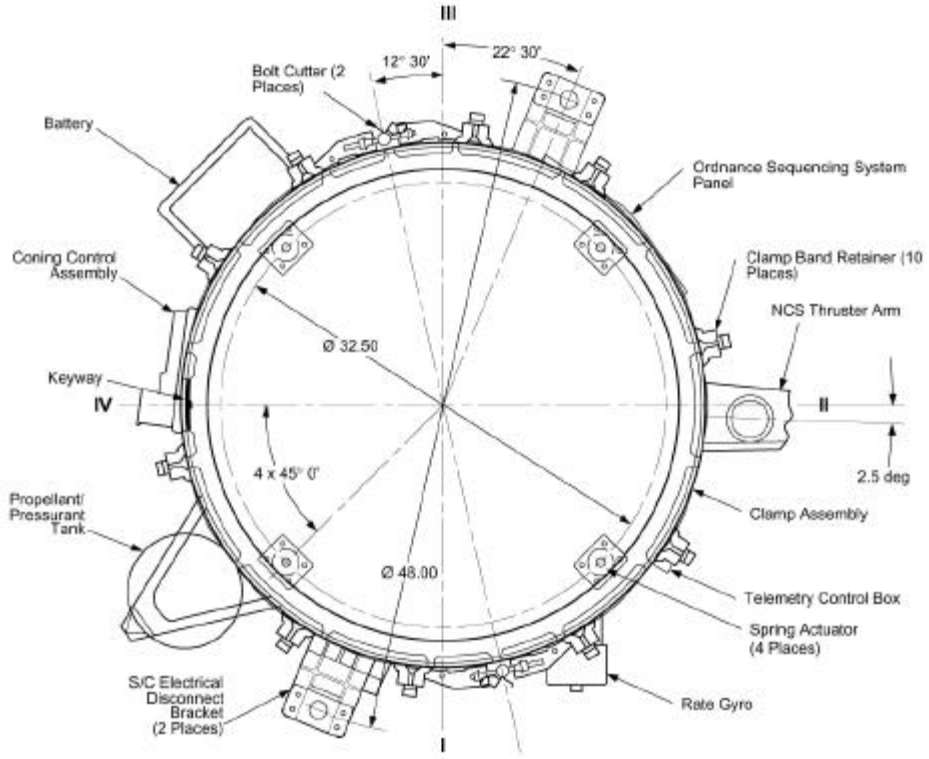
- 3712C Payload Attach Fitting (PAF)
  - Maximum Clamp Assembly Flight Preload = 5700 lb
  - S/C PAF Flange Angle = 20 Degrees



PAF_assy.tif

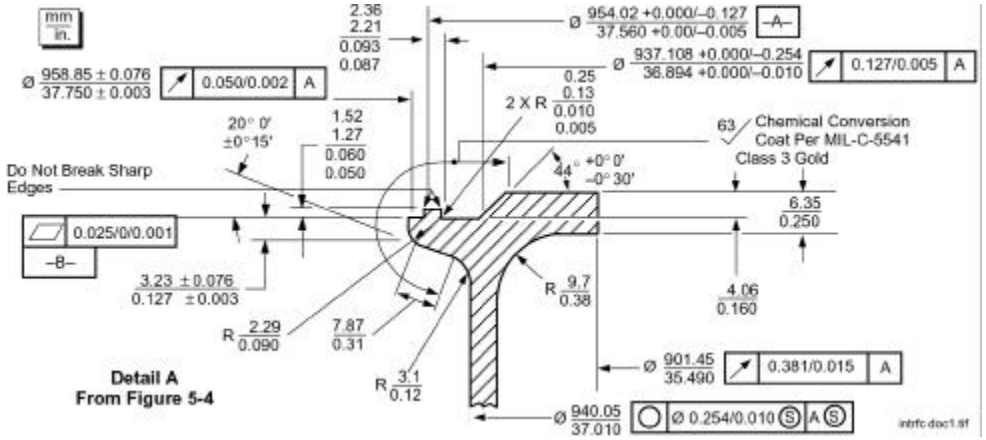
Payload Accommodations and Major Interfaces (4 of 6)

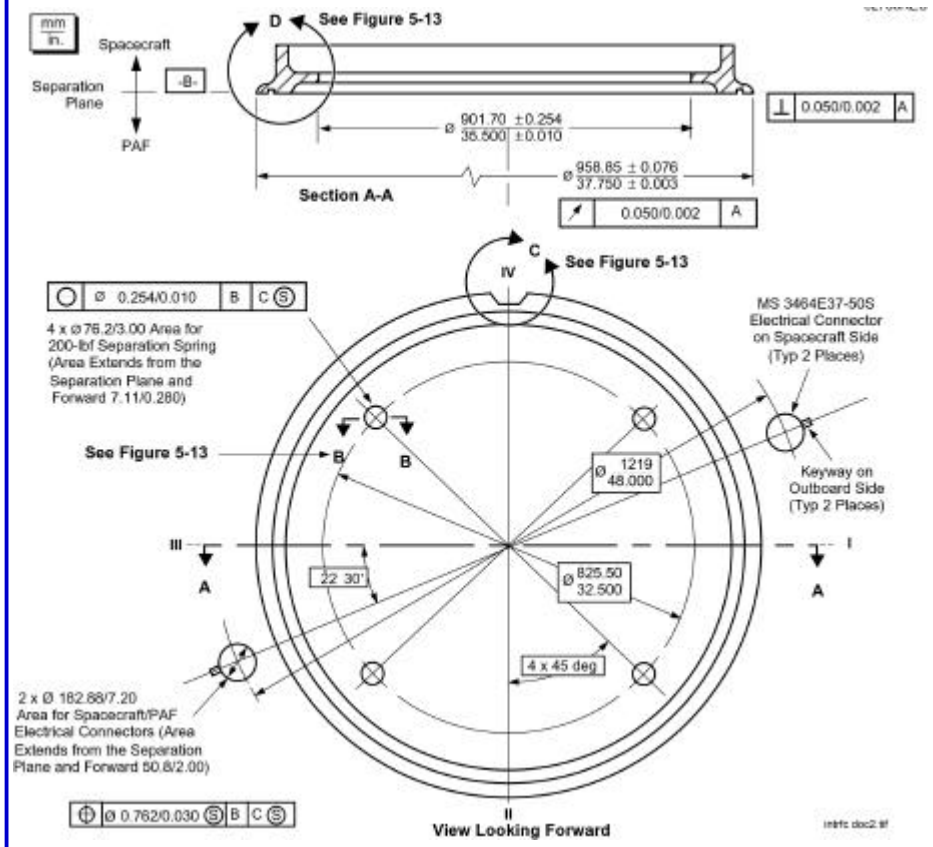
- **3712C PAF Detailed Assembly**



Payload Accommodations and Major Interfaces (5 of 6)

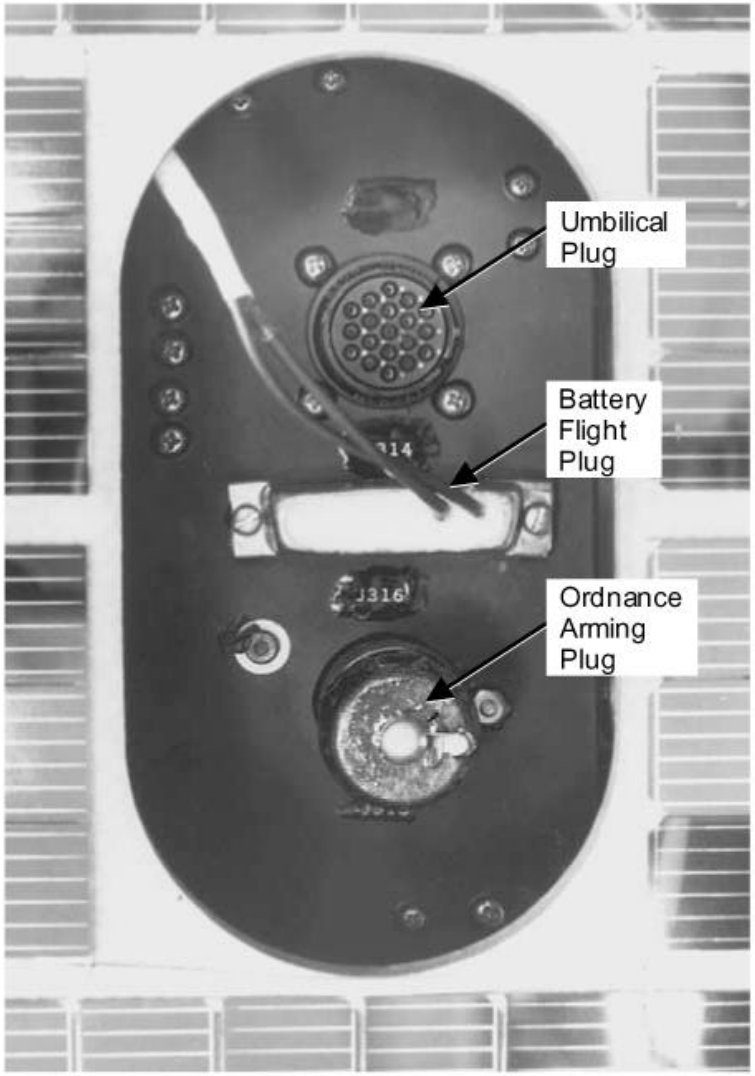
- **3712C PAF Interface Dimensions**





Payload Accommodations and Major Interfaces (6 of 6)

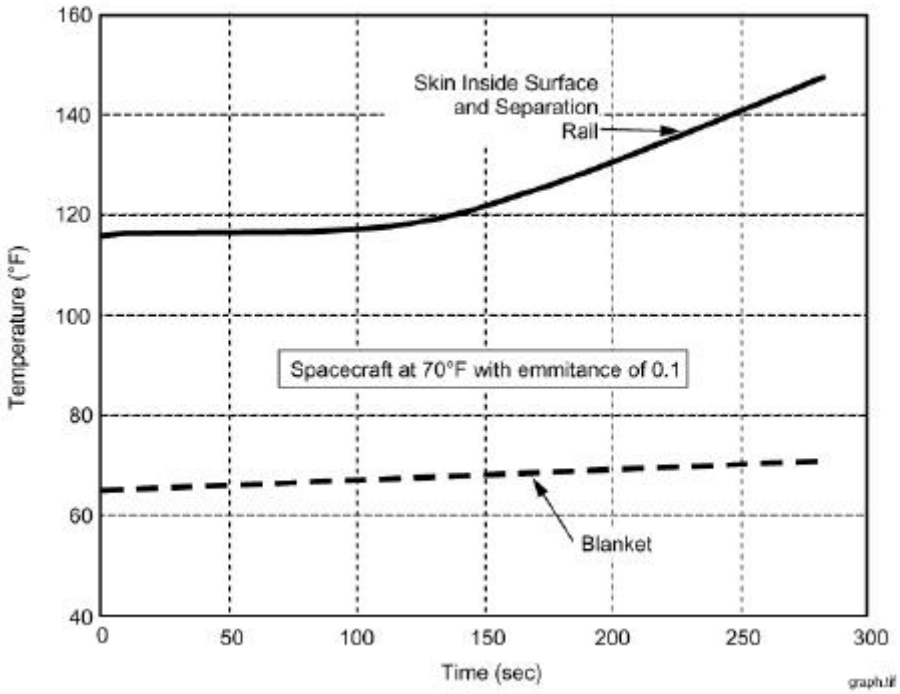
- **Electrical Interfaces**
  - **Two Standard 37-Pin S/C Umbilical Electrical Quick-Disconnect Connectors Located on PAF 180 Degrees Apart**
  - **Option for 61-Pin As Non Standard Service, If Required**
  - **Can Also Have Spacecraft Separation Switch Installed – to Be Coordinated With Delta Program Office**
  - **Standard Console and Blockhouse Provisions**



plug.tif

Environments (1 of 5)

- **Air Conditioning/Humidity/Contamination Control:**
  - **SLC-17:**
    - **Temp = 70 +/- 5 Degrees F**
    - **Humidity = 35 - 50%**
    - **Cleanliness = Class 100,000 (FED-STD-209D)**
- **Thermal:**
  - **Fairing Jettisoned at 0.1 Btu/ft^2-sec (1135 W/m^2)**



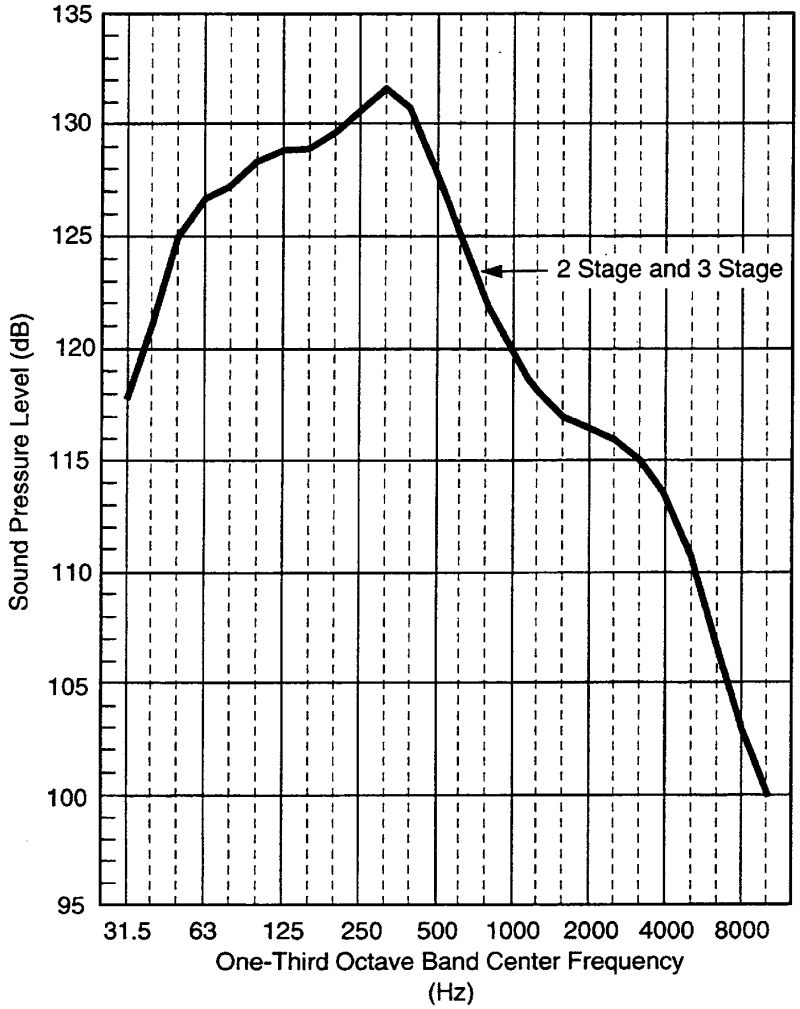
Environments (2 of 5)

- **Loads:**

	Liftoff/Transonic (g)	MECO (g)
Lateral	+/- 3.5	+/- 0.2
Axial	+2.8/-0.2	7.4 +/- 0.6

Environments (3 of 5)

- **Acoustics:**
  - **OASPL = 139.9 dB**

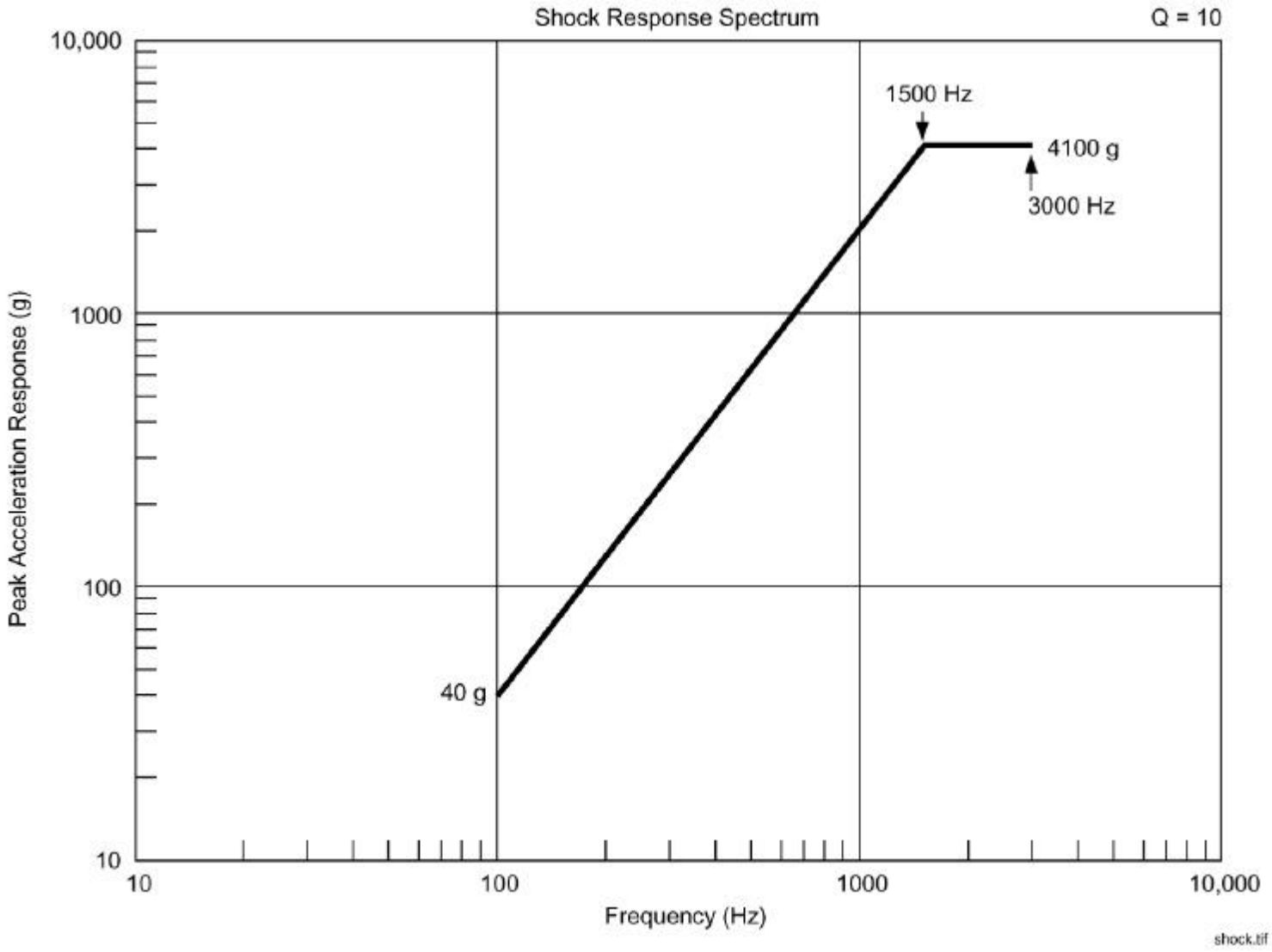


Maxunum Flight Levels (dB)	
One-Third Octave Center Frequency (Hz)	2-Stage and 3-Stage Mission
31.5	117.9
40	121
50	125
63	126.6
80	127.2
100	128.3
125	128.8
160	128.9
200	129.5
250	130.6
315	131.6
400	130.7
500	128
630	125
800	122
1000	120
1250	118
1600	117
2000	116.5
2500	116
3150	115
4000	113.5
5000	111
6300	107
8000	103
10,000	100
OASPL	139.9
Duration	10 seconds

predicted_delta.tif

Environments (4 of 5)

- **Shock:**



Environments (5 of 5)

- **Sinusoidal Vibration:**

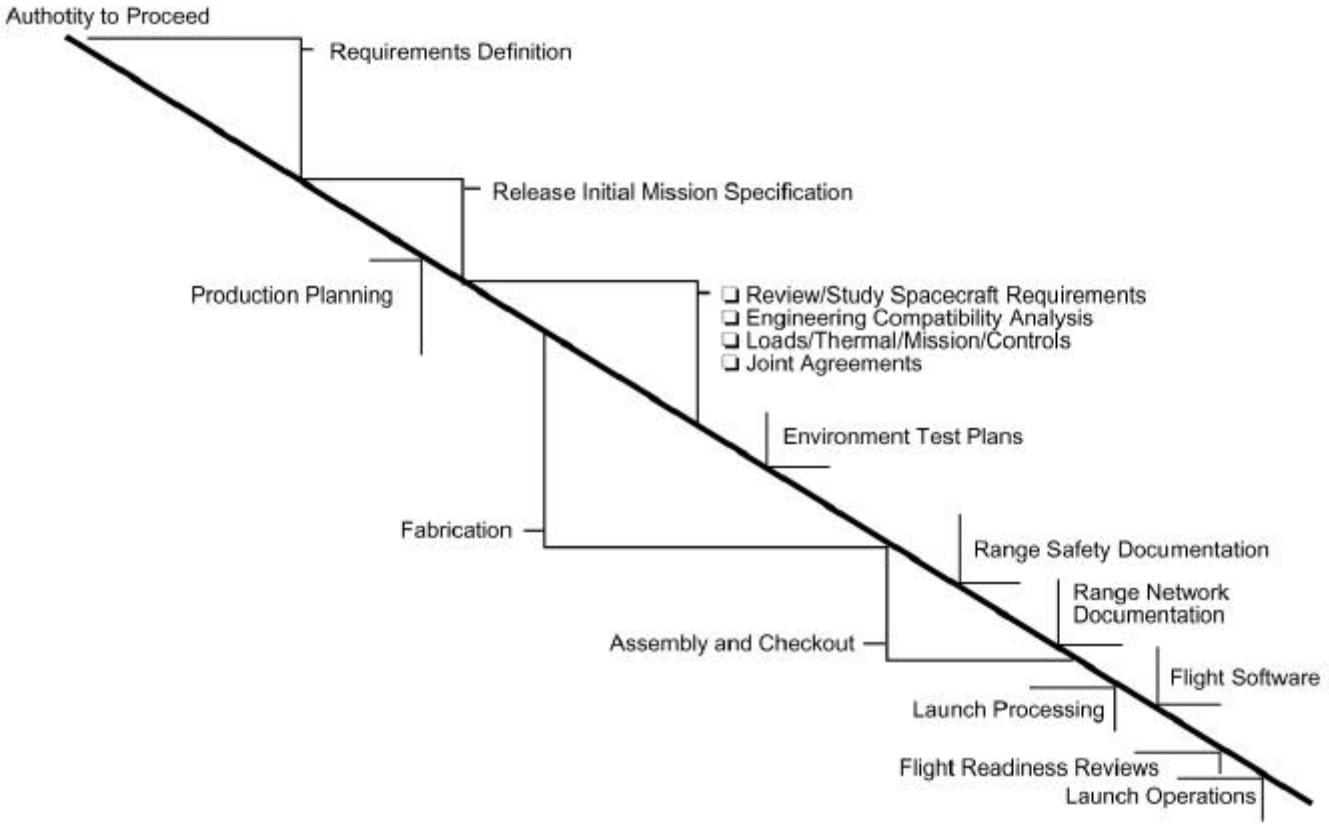
Axis	Frequency (Hz)	Maximum flight levels
Axial	5 to 6.2 6.2 to 100	1.27 cm (0.5 inch) double amplitude 1.0 g (zero to peak)
Lateral	5 to 100	0.7 g (zero to peak)

Payload Separation Attitude Accuracy and Rates

- **Spinning: De-Spin (0 +/- 5 rpm)**
- **Attitude: < 10.0 Degrees**
- **Rate: < 7.0 (Transverse) dps**

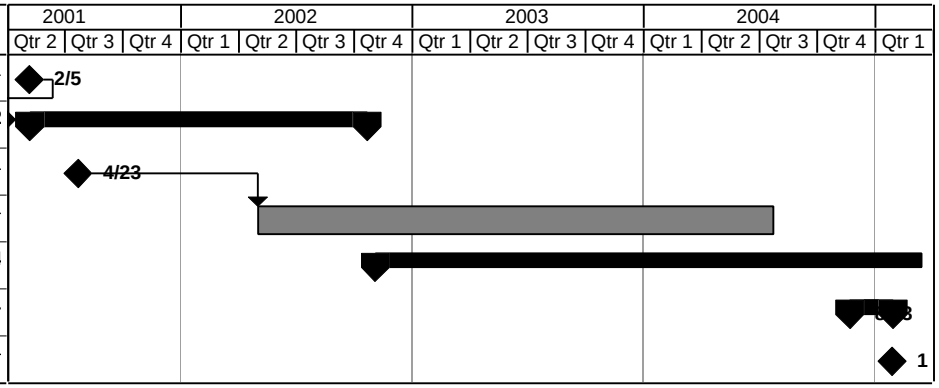
Integration Process

- **Delta II/FAME Integration Process Is L-30 Months (Standard Is L-27)**
- **Encompasses the Entire Life of LV/Spacecraft Integration Activities**
  - **Requires Series of Documents, Analyses, Reports, and Meetings**
  - **Formal Data Exchange Between FAME, NASA-KSC, and Boeing**



Launch Vehicle Integration and S/C Processing Schedule

ID	Task Name	Duration	Start	Finish
1	Launch Vehicle Integration Initiation	1 day	Mon 2/5/01	Mon 2/5/01
2	**Advance Payload Support-As Req'd**	**380 days**	**Tue 2/6/01**	**Mon 7/22/02**
13	Launch Vehicle ATP	1 day	Mon 4/23/01	Mon 4/23/01
14	Rqmts. Defn., ICD, Mission Int. Meetings	581 days	Fri 2/1/02	Fri 4/23/04
15	**Required Documentation and Activities**	**616 days**	**Mon 8/5/02**	**Mon 12/13/04**
41	**Launch Site Processing**	**50 days**	**Mon 8/23/04**	**Fri 10/29/04**
54	Launch	1 day	Fri 10/29/04	Fri 10/29/04



Trades Conducted

- 9.5’ vs 10’ Payload Fairing
  - Boeing Proposed Using 10’ Diameter Composite PLF
  - More Volume Than 9.5’
  - Less Spacecraft Interference Issues
  - Less Mass Capacity With 10’
- 2920-10 vs 2425-10 Vehicle
  - No Third Stage With 2920
  - 2920-10 Capability: m=1197 kg
  - 5 Additional Strap-Ons
  - » $4 M Additional Cost
  - Programmatic Decision to Incur Additional Cost